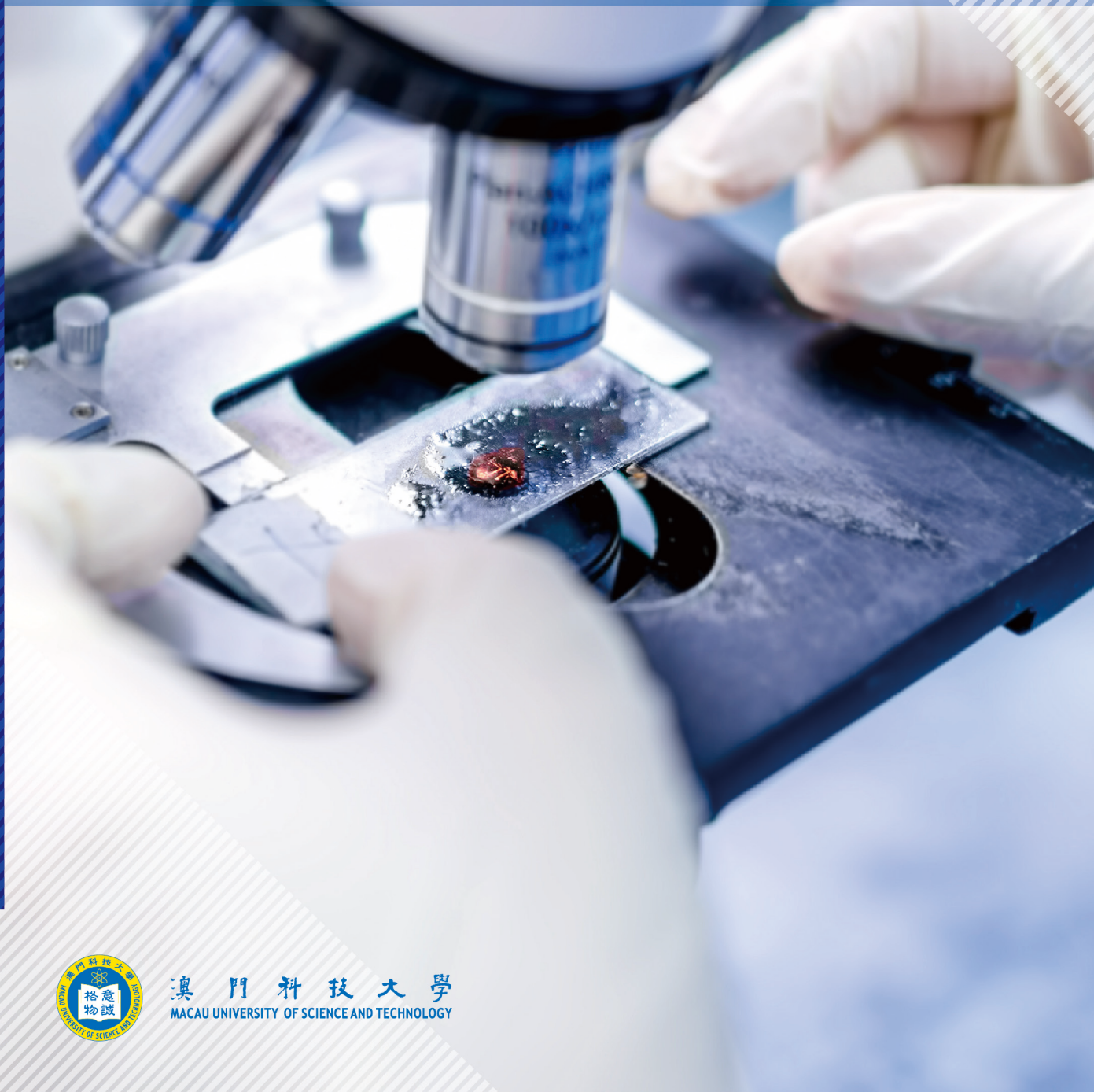




中藥質量研究
國家重點實驗室
(澳門科技大學)

State Key Laboratory of
Quality Research in Chinese Medicines
(Macau University of Science and Technology)



澳門科技大學
MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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中藥質量研究國家重點實驗室(澳門科技大學)由國家科技部批准，於2011年1月25日正式掛牌成立，是國家在中醫藥領域迄今唯一的國家重點實驗室。2014年1月通過了三年建設期驗收，2017年7月通過了發展期第一階段(3年)驗收，獲得專家組的一致好評。

The State Key Laboratory of Quality Research in Chinese Medicine (Macau University of Science and Technology) was approved by the Ministry of Science and Technology and formally established on January 25, 2011. So far, it has been the only state key laboratory in the field of Chinese medicine. In January 2014, it passed the inspection of the constructional phase (3 years). In July 2017, it passed the first inspection of the developmental phase (3 years) and received a unanimous praise from the expert delegations.

中藥質量研究國家重點實驗室的成立是中央政府致力推進中醫藥國際化發展，促進澳門經濟發展適度多元化和提升澳門科技水平的重要舉措。實驗室以成為具有國際先進水平的中藥質量和創新藥物研究基地、獲取原始創新研究成果和自主知識產權、彙聚和培育中醫藥優秀人才以及拓展國際高水平學術交流與合作為目標，注重集成多學科的前沿技術，建立適合中藥質量及創新藥物研究的開放式科學技術平臺，深入開展探索性、創新性和重大關鍵技術研究。

The establishment of the State Key Laboratory of Quality Research in Chinese Medicine is an important initiation for the central government to promote the international development of Chinese medicine, and to advance the moderate diversification of economic development and technological upgrading in Macao. The laboratory aims.

- I. to become a research base with advanced international standards in Chinese medicine quality control and innovative drugs,
- II. to obtain first-hand innovation research achievements and independent intellectual property ownerships,
- III. to bring together and cultivate talents in Chinese medicine and to develop international high-level academic exchanges and cooperation,
- IV. to focus on integrating cutting-edge multidisciplinary technologies,
- V. to establish open style scientific and technological platforms catered for the study on quality of Chinese medicine and innovative drugs quality research
- VI. to carry out in-depth explorative, innovative and major key technological research.



實驗室現有研究人員及研究生等逾300人，其中助理教授以上研究人員51人，包括諾獎獲得者、美國科學院院士、中國科學院院士、中國工程院院士、講座教授、教授、特聘教授、副教授以及助理教授等。助理教授以上研究人員均來自於國內外知名的教研機構，通曉中英雙語，具有豐富的研究經驗和國際視野，組成了一個集化學、生物學、藥理學等多個相關專業領域人才為一體的多學科結合、結構合理、實力雄厚的研究隊伍。

重點實驗室特別注重集成與融合多學科的最前沿技術，集中於中藥材和中藥複方質量控制與優化的創新技術與方法以及優質中藥新藥研發的關鍵技術和質量標準兩大研究方向，重點開展四個領域的研究，即

- (1) 基於“三多”特徵的中藥質量控制創新技術及理論基礎研究;
- (2) 人參等貴重中藥材質量評價與開發利用研究;
- (3) 抗癌及抗炎免疫中藥質量標準及其應用研究;
- (4) 腦神經退化和代謝性疾病創新中藥的研發技術與質量標準研究。





具體研究方向主要有：從外排轉運蛋白、線粒體分裂及與腸道菌羣相互作用等新角度，發現中藥成分的新藥理作用，中藥復方抗流感的優勢研究，中藥小分子對糖尿病及炎症疾病作用的多靶點機制，以及基於三多特徵的創新研究方法；基於藥效學-藥代動力學-質譜分析三結合的質量評價方法，人參皂苷對腸道微生物的藥理作用及防治缺血性心臟病的作用機制，新型人參皂苷的抗腫瘤作用及機制，基於組學技術的人參等貴重藥材質量控制評價方法；糖脂組學等新技術發現類風濕性關節炎等自身免疫性疾病新的診斷標誌物的發現和應用研究，分子模擬對接方法篩選具抗癌抗炎活性中藥小分子，抗癌及抗炎免疫治療新機制，抗炎免疫新模式動物模型以及基於組學技術的研究方法；從中藥中發現抗腦神經退化的活性成分、抗神經退化活性小分子化合物的合成、朊蛋白致病性突變對其折疊和聚集機制的影響、胰島澱粉樣蛋白上中藥小分子的結合位點；以及生物物理與中醫藥研究等。

There are more than 300 researchers and postgraduates in the laboratory, of whom 51 hold the positions as Assistant Professors or above, including Nobel laureates, academicians of the American Academy of Sciences, academicians of the Chinese Academy of Sciences and Chinese Academy of Engineering, Chair Professors, Professors, Distinguished Professors, Associate Professors and Assistant Professors and so on. Researchers who hold the positions as assistant professors or above are from well-known teaching and research institutions world wide and they are fluent English and Chinese bilinguals who possess prolific research experiences and international perspectives, forming a multi-disciplined, well-structured, and strong research team that integrates talents from a variety of related fields such as chemistry, biology and pharmacology.

The State Key Laboratory pays special attention to the integration of the most cutting-edge technologies in multidisciplinary areas, focusing on 2 research directions; the innovative technologies and methods for quality controls and optimization of herbal medicines and Chinese medicine compounds, as well as the key techniques and quality standards for the development of high quality new Chinese medicinal drugs. The four areas of research fields focused on are;

- (1) Technological innovations and basic research based on the complex characteristics of traditional Chinese medicine,
- (2) Preclinical and clinical study of high-value Chinese medicinal herbs,
- (3) Standardization and application of anti-cancer and anti-immune Chinese medicines,
- (4) Development and quality control of novel Chinese medicines against neurodegenerative and metabolic disorders.

Specific research directions include:

Discovery of new pharmacological effects in TCM, anti-influenza studies in Chinese herbal compounds' superiority, multi-target treatment mechanism on diabetes and anti-inflammatory diseases, and to develop innovative research methods based on complex characteristics of TCM through the new perspectives of efflux transporter, mitochondrial division and interaction with intestinal microflora;

Combinational quality assessment methods based on pharmacodynamics-pharmacokinetics-mass spectrometry, pharmacological effects of ginsenosides on intestinal microflora and prevention of ischemic heart disease, anti-cancer effects and mechanisms of novel ginsenosides, quality control evaluation of ginseng and other valuable herbal medicines with omics technology;

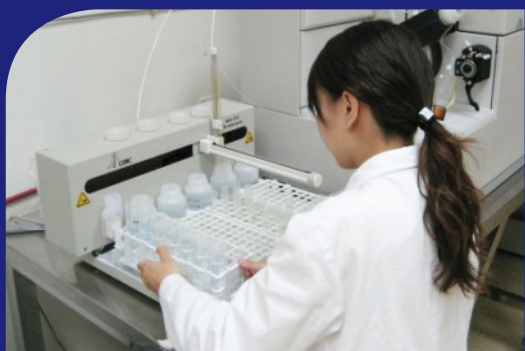
The discovery of new diagnostic markers and applied research in autoimmune diseases by new techniques such as glycolipidomics, screening of small molecules with anti-cancer and anti-inflammatory activities by molecular computational docking, new mechanism of anti-cancer and anti-inflammatory therapy, new animal models in anti-inflammatory immunity and research methods based on omics technology;

Identifying active components in Chinese medicine against brain degeneration, synthesizing anti-neuro-degenerative active small molecular compounds, investigation of the effect of pathogenic mutation of prion on its folding and aggregation mechanism, the binding site of TCM small molecules in islet amyloid protein; and biophysical research in Chinese medicine.





實驗室在上述重點領域內已取得一些重要的科學發現，包括：發現一系列結構新穎、活性顯著的中藥成分；發現多種中藥成分的新活性及作用機制；建立了基於創新組學技術（蛋白組學、脂組學、糖組學）的研究平臺，以系統地揭示中藥作用的靶網絡；發現一種新的抗腫瘤耐藥機制、一個新的抗炎靶點及新的致癌基因；建立了基於多元分析技術的質量評價方法，更全面有效地評價藥材真偽和質量優劣。相關研究成果已發表於 Science, Nature, Nature Methods, Annals of Rheumatic Diseases, Analytical Chemistry, Organic Letters, Cell Death and Disease 等主流學術期刊；獲多項獎勵，包括2012國家科技進步二等獎，2014澳門特區科學技術獎勵之特別獎及自然科學獎二等獎，2016澳門特區科學技術獎勵之自然科學獎一等獎、技術發明獎二等獎及科技進步獎三等獎、2018澳門特區科學技術獎勵之自然科學獎二等獎，教育部2014年度高等學校研究優秀成果獎自然科學獎一等獎，2017年度全國創新爭先獎，第十二屆中國藥學會科學技術獎二等獎，2017年度廣東省科學技術獎一等獎，2017年度四川省科技進步獎一等獎，2012、2014、2016及2018研究生科技研發獎，此外還有1人獲選國家教育部2014年度長江學者講座教授，1人獲得國家自然科學基金海外及港澳學者合作研究基金。



The laboratory has made some important scientific discoveries in the above-mentioned key areas, including:

- ▶ discovering a series of traditional Chinese medicine ingredients with novel structure and significant treatment efficacy;
- ▶ discovering the new activity and mechanism of various Chinese herbal ingredients;
- ▶ establishing a research platform based on innovative omics technology (proteomics, lipidomics, glycomics) to systematically reveal the target network of traditional Chinese medicines;
- ▶ discovering new anti-tumor drug resistance mechanism, new anti-inflammatory target and new oncogene;
- ▶ established a quality evaluation method based on multivariate analysis techniques, a more comprehensive and effective assessment of authenticity and quality of herbal medicines. Related research results have been published in mainstream academic journals such as Science, Nature, Nature Methods, Annals of Rheumatic Diseases, Analytical Chemistry, Organic Letters, Cell Death and Disease etc;

The laboratory has received multiple academic awards which include;

- ▶ 2012 National Science and Technology Progress Award (Second Prize),
- ▶ Macau SAR Science and Technology Award
(2014 Special Award & Natural Science Award (Second Prize))
(2016 Natural Science Award (First Prize) & Technical Invention Award (Second Prize) & Science and Technology Progress Award (Third Prize))
(2018 Natural Science Award (Second Prize))
(2012, 2014, 2016, 2018 Graduate Technology R&D Award),
- ▶ National Ministry of Education Academic Research Outstanding Achievement Award for Colleges and Universities - 2014 Natural Science Award (First Prize),
- ▶ 2017 National Innovation Award Winner,
- ▶ The 12th annual China Pharmaceutical Association Science and Technology Award - Science and Technology Award (Second Prize)
- ▶ 2017 Guangdong Provincial Science and Technology Award (First Prize),
- ▶ 2017 Sichuan Provincial Science and Technology Progress Award (First Prize),

In addition, one researcher was selected as the Chang-Jiang Scholar Chair Professor by the State Ministry of Education of PRC in 2014. Another researcher was granted the National Natural Science Foundation of China - Overseas and Hong Kong- Macao Scholar Collaborative Research Fund.





重點實驗室近年來積極開展交流與合作，已與17間知名教研機構建立聯合實驗室或研究中心；定期與澳門科技發展基金以及“兩岸四地中醫藥科技合作中心”共同舉辦學術會議及研修班。實驗室亦致力於推動中藥國際標準化及拓展高技術服務，已成立澳門中藥國際標準中心，推動建立中藥國際標準，負責國際標準組織（ISO）中醫藥技術委員會（TC249）中藥材工作組（WG1）運作；實驗室已獲得澳大利亞NATA/ISO17025認證，可為兩岸四地科研機構及企業提供符合國際ISO標準的中藥產品及食品檢測服務。

In recent years, the State Key Laboratory has been actively conducting exchanges and cooperation events, and has established joint laboratories or research centers with 17 well-known teaching and research institutions, regularly co-organizing academic conferences and seminars with the Macao Science and Technology Development Fund and “Cross-Strait Scientific Collaboration Center for Chinese Medicine”. The laboratory is also committed to promoting the international standardization of Chinese medicine and expanding the development of high-technological services with the founding of “Macau Centre for International Standard of Chinese Medicines”. It has promoted the establishment of international standards for Chinese medicine, and has been responsible for the operation of the Chinese Herbal Medicine Working Group (WG1) of the Chinese Medicine Technical Committee (TC249) within the International Standard Organization (ISO); The laboratory has obtained Australian NATA/ISO17025 certification, which can provide testing services in Chinese medicine and food products that conform to international ISO standards for scientific research institutions and enterprises across the cross strait.

因應實驗室的發展目標和主要研究領域，實驗室目前下設八個研究室和研究中心：中藥質量控制與評價技術研究室、中藥化學與生物有機化學研究室、中藥活性評價及分子藥理研究室、中藥製劑新技術與新劑型研究室、組學技術與創新藥物研究中心、澳門質譜及核磁共振光譜測試中心、中藥及食品安全與質量檢定中心、中藥質量與安全用藥資訊中心。還建立了諾獎獲得者工作站“內爾博士生物物理與中醫藥研究實驗室”。

In response to the laboratory's development goals and major research areas, the laboratory currently consists of 8 research laboratories and research centers:

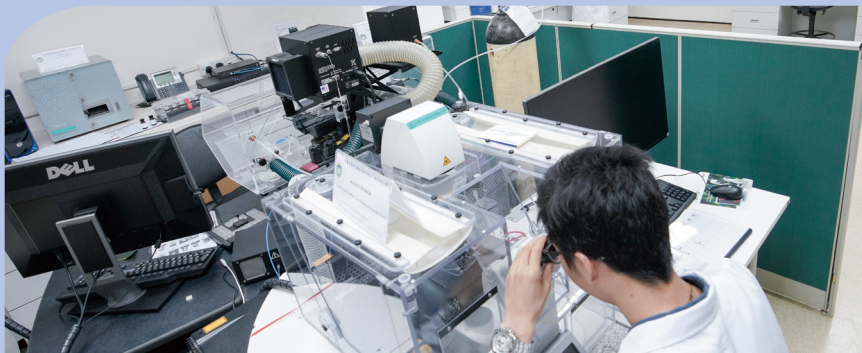
- ▶ Laboratory for Quality Assessment and Control of Chinese Medicines,
- ▶ Laboratory for Bioorganic and Chinese Materia Medica Chemistry,
- ▶ Laboratory for Bioassay and Molecular Pharmacology of Chinese Medicines,
- ▶ Laboratory for New Formulation Technology of Chinese Medicinal Preparations,
- ▶ Center for Omics Technology and Innovative Drug Research,
- ▶ Macau Center for MS and NMR Analysis,
- ▶ Center for Safety and Quality Assurance of Chinese Medicines and Foods,
- ▶ Center for Quality and Safety Information of Chinese Medicines.

“Dr. Neher's Biophysics Laboratory for Chinese Medicine” a Nobel laureate workstation has also been established.



實驗室擁有一系列先進、精良、高端的實驗儀器設備和系統，包括各類液相/質譜和氣相/質譜聯用儀近30臺，及一系列進行整體動物-細胞-分子水平的藥物生物活性評價研究所需的最高端的化學分析和系統生物學組學技術研究設備，如LC-SPE-NMR (600 MHz) (Bruker), PacBio第三代測序儀，計算機輔助藥物設計大規模計算機集群，Time-of-Flight Secondary Ion Mass Spectrometer，2D nano-LC-MADLI TOF-TOF System (Bruker), Agilent 1290 UHPLC with 6490 Triple QuadrupoleMS System, Agilent 1290 UHPLC with 6460 Triple Quadrupole MS System, Agilent 1290 UHPLC with 6550 TOF MS System, Agilent 1290 UHPLC with 6230 TOF MS System, Agilent 2D-LC Chip with 6460 Triple Quadrupole System, DeltaVision Live-Cell Imaging System, BD FACSAriaIII Flow Cytometer, GE Healthcare DIGE System 等，設備總值超過2.5億澳門元。

The laboratory is equipped with a series of advanced, sophisticated, high-end laboratory instruments and processing systems, including 30 sets of all types of liquid/mass spectrometry and gas/mass spectrometers, and a series of the most advanced chemical analysis and systems biology techniques and research equipment required for the evaluation of the overall animal-cell-molecule drug biological activity, such as LC-SPE-NMR (600 MHz) (Bruker), PacBio Third generation sequencer, Computer-aided drug design for large-scale computer clusters, Time-of-Flight Secondary Ion Mass Spectrometer，2D nano-LC-MADLI TOF-TOF System (Bruker), Agilent 1290 UHPLC with 6490 Triple QuadrupoleMS System, Agilent 1290 UHPLC with 6460 Triple Quadrupole MS System, Agilent 1290 UHPLC with 6550 TOF MS System, Agilent 1290 UHPLC with 6230 TOF MS System, Agilent 2D-LC Chip with 6460 Triple Quadrupole System, DeltaVision Live-Cell Imaging System, BD FACSAriaIII Flow Cytometer, GE Healthcare DIGE System etc, the total value of equipment exceeds 250 million Patacas.



目前，實驗室已創建的高新技術平臺主要有：

At present, the high-tech platforms provided by the laboratory are:

天然化合物分離和結構鑒定技術
Isolation and structure elucidation of natural compounds technology,

中藥鑒定基因條碼技術
Traditional Chinese medicines genes barcode identification technology,

亞細胞及分子顯微可視化技術
Subcellular and molecular microscopic visualization technology,

生物有機化學技術
Bioorganic chemistry technology,

糖/糖肽組學分析研究技術
Glucose/Glycopeptidomics analysis technology,

脂組學分析研究技術
Lipidomics analysis technology,

蛋白質組學分析研究技術
Proteomics analysis technology,

幹細胞分析研究技術
Stem cells analysis technology,

中藥納米制劑技術
Chinese medicine nano preparations technology,

微流控芯片鑄造及研究
Microfluidic chip casting and research,

單細胞研究
Single cell research,

基於納米材料的抗腫瘤藥物靶向輸送技術
Nanomaterial-based targeted delivery technology for anti-tumor drugs,

藥物篩選和設計及醫藥大數據
Drug screening & design and pharmaceutical data analysis

中藥成分細胞內藥動學研究技術
Chinese medicine ingredients intracellular pharmacokinetics research techniques.

查詢 Enquiries

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